

REMARKS

Status of the claims:

With the above amendments, claims 1 and 10 are amended and claim 19 is added. Claims 1-19 are pending and ready for further action on the merits. No new matter has been added by way of the above amendments. Claims 1 and 10 have been amended simply for clarity. These amendments are non-narrowing in scope. Support for new claim 19 can be found in claim 7. Reconsideration is respectfully requested in light of the following remarks.

Specification Objections

The Examiner has objected to the specification for certain informalities.

i) The Examiner asserts that at page 4, line 12 to page 5, line 1, at page 6, lines 14-28 and at page 60, lines 5-15, there are different definitions for the same variable "B". Applicants have amended the chemical formula at page 4, line 18 so that the "[B]" is "[D]". Applicants believe that with this amendment, the objection has been obviated. Withdrawal of the objection is warranted and respectfully requested.

ii) At page 12, line 20, the Examiner has recommended amending "1,4-cyclohexylen" to recite "1,4-cyclohexylene". Applicants have amended the written description accordingly.

Applicants believe that with this amendment, the objection has been obviated. Withdrawal of the objection is warranted and respectfully requested.

iii) At page 13, line 23, the Examiner has recommended amending "hexamethylsilazane" to recite "hexamethyldisilazane". Applicants have amended the written description accordingly. Applicants believe that with this amendment, the objection has been obviated. Withdrawal of the objection is warranted and respectfully requested.

iv) At page 18, lines 10 and 12, the Examiner has recommended amending "diosulfide" to "disulfide". Applicants have amended the written description accordingly. Applicants believe that with this amendment, the objection has been obviated. Withdrawal of the objection is warranted and respectfully requested.

v) At page 18, line 17, the Examiner has recommended amending "Selenium" to "selenium". Applicants have amended the written description accordingly. Applicants believe that with this amendment, the objection has been obviated. Withdrawal of the objection is warranted and respectfully requested.

vi) At page 19, line 23, the Examiner has recommended amending "boll-like" to recite "ball-like". Applicants have amended the written description accordingly. Applicants believe that with this amendment, the objection has been obviated.

Withdrawal of the objection is warranted and respectfully requested.

### Drawings

The Examiner asserts that corrections to the drawings must be made. Attached to this response, please find formal drawings. Accordingly, withdrawal of the objection to the drawings is warranted and respectfully requested.

### Claim Objections

The Examiner has objected to different definitions for the same variable "B" in claims 1 and 10. Applicants have amended the chemical formula in these claims so that the "[B]" is a "[D]". Applicants believe that with this amendment, the objection has been obviated. Withdrawal of the objection is warranted and respectfully requested.

The Examiner has objected to the use of  $1.0 \times 10^{-5}$  -  $5.0 \times 10^{-3}$  mol of alkoxysilane in claim 1. Applicants in claims 1 and 10 have amended the claim to recite "per 100 g of the ethylene/ $\alpha$ -olefin/non-conjugated polyene copolymer rubber (A)". The units "weight parts" are a relative unit. In contrast the unit "mol" is an absolute unit. Therefore, the units "weight parts" for components (A) and (B) are inconsistent with the unit "mol" of the amount of alkoxysilane compound (C).

Applicants point out that in Example 1 of the written description, 0.5 weight parts ( $1.0 \times 10^{-3}$  mole) of bis-3-(triethoxysilyl) propyltetrasulfane is blended to 100 weight parts of ethylene/ propylene/5-vinyl-2-norbornene copolymer rubber (A-1). The molecular weight of bis-3-(triethoxysilyl) propyltetrasulfane [Si-69] is 510. Therefore,  $1.0 \times 10^{-3}$  mole of Si-69 means 0.51 g of Si-69. The value of "0.51" is substantially identical to the value of "0.5 weight parts" indicated in Example 1. Thus, for the above reasons, Applicants believe that the objection has been obviated. Withdrawal of the objection is warranted and respectfully requested. No new matter has been added for the reasons discussed hereinabove.

**Rejections under 35 USC §102**

Claims 1-5, 8-14, and 17-18 are rejected under 35 USC §102(e) as being anticipated by Yatsuyanagi '597 (US Patent No. 6,033,597).

Claims 1-5, 8-14, and 17-18 are rejected under 35 USC §102(b) as being anticipated by Thurn '489 (US Patent No. 3,873,489).

These rejections are traversed for the following reasons.

The composition of the present invention comprises  $1.0 \times 10^{-5}$  -  $5.0 \times 10^{-3}$  mol of the alkoxysilane compound (C) per

100 g of the ethylene/ $\alpha$ -olefin/non-conjugated polyene copolymer rubber (A).

Applicants respectfully direct the Examiner's attention to Tables 4, 5, 7, 11 and 12 of the written description wherein it is shown that when the amount of the alkoxysilane compound (C) is outside the above range, the desired effects of the instant invention are not obtained.

Yatsuyanagi '597 does not disclose any concrete compositions comprising an ethylene-propylene-diene rubber such as EPDM. Thus, Yatsuyanagi '597 cannot anticipate the instant invention because Yatsuyanagi '597 fails to disclose the elements of the instant invention. In other words, there is not a single example anywhere in the Yatsuyanagi '597 reference that contains the elements of the instant invention. The anticipatory rejection over Yatsuyanagi '597 is inapposite. Withdrawal of the rejection is warranted and respectfully requested.

Thurn '489 discloses in Example 9, a rubber composition comprising a terpolymer ethylene-propylene rubber and bis-3-(triethoxysilyl) propyltetrasulfane [Si-69]. See "Mixture 2" in Thurn '489 at column 19. However, the amount of Si-69 is 5 weight parts per 100 weight parts rubber ( $1.0 \times 10^{-2}$  mol per 100 g of the rubber). This amount is outside of the claimed range in claim 1 and is the same as Comparative Example 8 in the

present written description. Thus, because this value is outside of the claimed range, Thurn '489 fails to disclose the elements of the instantly claimed invention. The rejection over Thurn '489 is inapposite. Withdrawal of the rejection is warranted and respectfully requested.

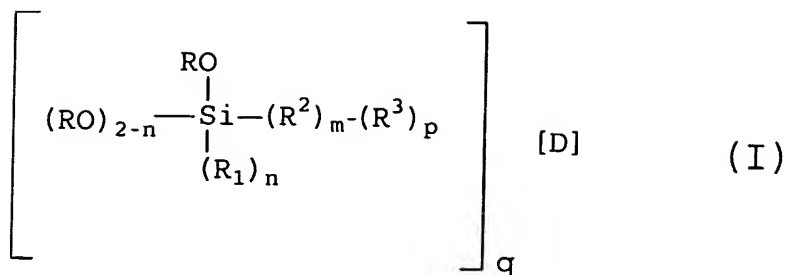
**Rejections under 35 USC §§ 102/103**

Claims 6-7 and 15-16 are rejected under 35 USC §§102(b) and (e) as being anticipated by Thurn '489 or Yatsuyanagi '597, respectively, or alternatively under 35 USC §103(a) as being unpatentable over Thurn '489 or Yatsuyanagi '597.

These rejections are traversed for the following reasons.

**Present Invention**

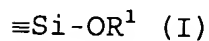
The present invention, as recited in claim 1, relates to a rubber composition for extrusion comprising 100 weight parts of ethylene /  $\alpha$ -olefin / non-conjugated polyene copolymer rubber (A) composed of ethylene,  $\alpha$ -olefin having carbon atoms of 3 - 20 and non-conjugated polyene, and at least 30 - 300 weight parts of carbon black (B) and  $1.0 \times 10^{-5}$  -  $5.0 \times 10^{-3}$  mol of alkoxysilane compound (C) per 100 g of the ethylene/  $\alpha$ -olefin/non-conjugated polyene copolymer rubber (A), the alkoxysilane compound (C) being shown by the following formula (I):



wherein, R is an alkyl group having carbon atoms of 1 - 4 or an alkoxy group having carbon atoms of 1 - 4, R<sup>1</sup> is an alkyl group having carbon atoms of 1 - 4 or phenyl group, n is 0, 1 or 2, R<sup>2</sup> is a bivalence of linear or branched hydrocarbon group having carbon atoms of 1 - 6, R<sup>3</sup> is an arylene group having carbon atoms of 6 - 12, m and p are 0 or 1 respectively, and m and p are not 0 at a same time, q is 1 or 2, D is -SCN or -SH when q is 1, and -Sx- when q is 2 (wherein x is an integer of 2 - 8).

#### Disclosure of Yatsuyanagi '597

Yatsuyanagi '597 discloses a rubber composition said to have improved properties containing a starting rubber such as a diene rubber and a compounding agent comprising a mixture of a polysiloxane having the following alkoxysilyl group (I) and having an average degree of polymerization of 3 to 10,000:

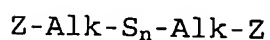


wherein, R<sup>1</sup> is a substituted or unsubstituted monovalent hydrocarbon group having 1 to 18 carbon atoms or an organic

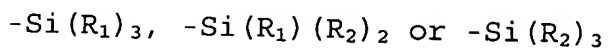
group containing an ether bond and  $R^2$  is hydrogen or a hydrocarbon group having 1 to 21 carbon atoms, and a sulfur containing silane.

**Disclosure of Thurn '489**

Thurn '489 discloses sulfur containing organosilicon compounds having the general formula



in which Z is



where  $R_1$  is  $(C_1-C_4)$  alkyl, cyclohexyl, or phenyl,  $R_2$  is  $(C_1-C_8)$  alkoxy,  $(C_5-C_8)$  cycloalkoxy,  $(C_1-C_8)$  alkylthio or an alkyl group of a divalent aliphatic hydrocarbon or unsaturated aliphatic hydrocarbon or a cyclic hydrocarbon of 1-18 carbon atoms and  $n$  is a whole number from 2 to 6. The compounds are used as reinforcing additives in rubber mixtures containing a silica or silicate filler, or in carbon black. The organosilane is coated on the surface of silica or silicate filler particles.

**Removal of the Rejection over Yatsuyanagi '597**

The composition of the present invention comprises  $1.0 \times 10^{-5}$  -  $5.0 \times 10^{-3}$  mol of the alkoxy silane compound (C) per 100 g of the ethylene/ $\alpha$ -olefin/non-conjugated polyene copolymer rubber (A).



Applicants respectfully direct the Examiner's attention to Tables 4, 5, 7, 11 and 12 of the written description wherein it is shown that when the amount of the alkoxysilane compound (C) is outside the above limits, the desired effects of the instant invention are not obtained.

Applicants respectfully submit that there is no anticipation of claims 6, 7, 15 and 16 for the same reasons as discussed above with respect to the rejections in paragraphs 7-10 of the Office Action.

Yatsuyanagi '597 does not disclose any concrete compositions comprising an ethylene-propylene-diene rubber such as EPDM. Thus, Yatsuyanagi '597 cannot render obvious the instant invention because Yatsuyanagi '597 fails to concretely disclose the elements of the instant invention. Applicants submit that the Examiner is "picking and choosing" to arrive at the instant invention. Moreover, Yatsuyanagi '597 fails to disclose or suggest  $1.0 \times 10^{-5}$  -  $5.0 \times 10^{-3}$  mol of alkoxysilane compound (C) per 100 g of the ethylene/  $\alpha$ -olefin/non-conjugated polyene copolymer rubber (A) as claimed in claims 1 and 10 of the instant invention. Thus, Applicants submit that the rejection over Yatsuyanagi '597 is inapposite as all of the elements of the instantly claimed invention have not been shown. Withdrawal of the rejection over Yatsuyanagi '597 is warranted and respectfully requested.

Removal of the Rejection over Thurn '489

Thurn '489 discloses in Example 9, a rubber composition comprising a terpolymer ethylene-propylene rubber and bis-3-(triethoxysilyl) propyltetrasulfane [Si-69]. See "Mixture 2" in Thurn '489 (column 19). However, the amount of Si-69 is 5 weight parts per 100 weight parts rubber ( $1.0 \times 10^{-2}$  mol per 100 g of the rubber). This amount is outside of the claimed range in claim 1 and is the same as Comparative Example 8 in the present written description. Accordingly, Applicants assert that the Examiner has failed to make out a *prima facie* case of obviousness with regard to the 35 USC §103(a) rejection over Thurn '489. Three criteria must be met to make out a *prima facie* case of obviousness.

- 1) There must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.
- 2) There must be a reasonable expectation of success.
- 3) The prior art reference (or references when combined) must teach or suggest all the claim limitations.

See MPEP §2142 and *In re Vaeck*, 20 USPQ2d 1438 (Fed. Cir. 1991). In particular, the Examiner has failed to meet the third element to make a *prima facie* obviousness rejection. Thurn '489 fails to disclose an amount of  $1.0 \times 10^{-5}$  -  $5.0 \times 10^{-3}$  mol of

alkoxysilane compound (C) per 100 g of the ethylene/  $\alpha$ -olefin/non-conjugated polyene copolymer rubber (A) as claimed in claim 1 of the instant invention.

For this reason alone, the rejection over Thurn '489 is inapposite. Withdrawal of the rejection is warranted and respectfully requested.

Even if a proper *prima facie* case of obviousness were made regarding Thurn '489 (which Applicants do not concede), the instant invention shows unexpectedly superior results to the disclosure of Thurn '489. Please note that the amount of Si-69 in Example 9 in Thurn '489 (column 19) is 5 weight parts per 100 weight parts rubber ( $1.0 \times 10^{-2}$  mol per 100 g of the rubber), which is outside of the claimed range in claim 1 and is the same as Comparative Example 8 in the present written description. Applicants point out that Comparative Example 8 is inferior to the Examples in the instant invention (for example, please see Tables 4 and 5 on pages 36 and 37, respectively of the instant invention). Thus, for this reason also, Thurn '489 cannot anticipate nor can Thurn '489 render obvious the instant invention. The rejection is inapposite. Withdrawal of the rejection is warranted and respectfully requested.

With the above remarks and amendments, it is believed that the claims, as they now stand, define patentable subject matter

such that passage of the instant invention to allowance is warranted. A Notice to that effect is earnestly solicited.

If any questions remain regarding the above matters, please contact Applicant's representative, T. Benjamin Schroeder (Reg. No. 50,990), in the Washington metropolitan area at the phone number listed below.

Pursuant to the provisions of 37 C.F.R. §§ 1.17 and 1.136(a), Applicants respectfully petition for one (1) month extension of time for filing a response in connection with the present application. The required fee of \$110.00 is attached hereto.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By



Marc S. Weiner, #32,181

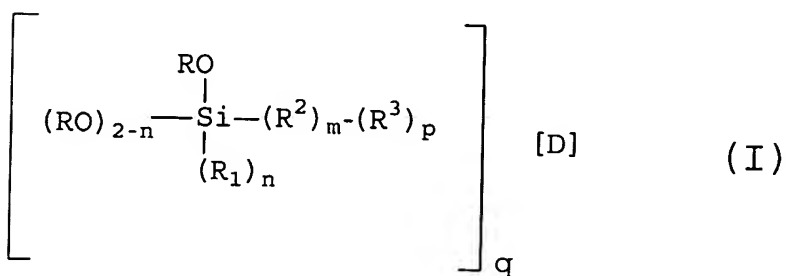
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Attachments: Abstract of Disclosure  
Three (3) sheets of Formal Drawings

ABSTRACT OF THE DISCLOSURE

This invention relates to a rubber composition for extrusion and molding comprising 100 weight parts of ethylene /  $\alpha$ -olefin / non-conjugated polyene copolymer (A) composed of ethylene,  $\alpha$ -olefin having carbon atoms of 3-20 and non-conjugated polyene, and at least 30-300 weight parts of carbon black (B), and  $1.0 \times 10^{-5}$  -  $5.0 \times 10^{-3}$  mol of an alkoxysilane compound shown by the following formula (I):



wherein, R is alkyl or alkoxy,  $\text{R}^1$  is alkyl or phenyl, n is 0, 1 or 2,  $\text{R}^2$  is a bivalent hydrocarbon,  $\text{R}^3$  is arylene group, m and p are 0 or 1 respectively, and m and p are not 0 at a same time, q is 1 or 2, and D is -SCN or -SH when q is 1, and -Sx- when q is 2 (wherein x is an integer of 2 - 8).